

ODU MAC LC Modular Attachable Connector

Stand: February 2008

All dimensions in mm. All figures are illustrations of photos. Changes reserved

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ODU MAC LC

Modular Attachable Connector



The new ODU MAC LC is mainly designed for the use as a service- and interface connector. The main application areas are e.g. machine construction, measurement, medical technology etc.

Most interface connectors in the area of machine construction are often actuated only a few times. For this kind of application the new ODU MAC LC offers clear price benefits because of the ODU standard contact technology.







ODU MAC LC is an economical alternative with proven ODU contact technology using turned/slotted contacts up to 5,000 mating cycles.

The economic aspect is reinforced by the simple processing of the contacts and modules. User-friendly assembly and removal, even when assembled, distinguish the ODU MAC LC as a service connector.

The new system offers many advantages for the user.

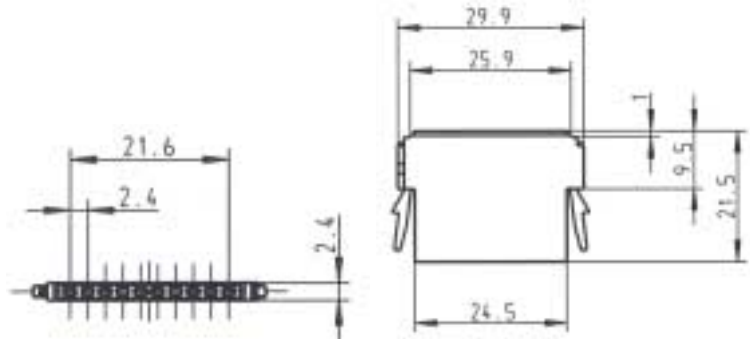
- Economical interface solution in premium quality
- Proven ODU contact technology
- 4 frame sizes
- Different contact inserts (Modules) available
- Centering and keying using the guiding system, frame is grounded
- Easy assembly and removal of the contact using clip technology
- Simple, quick packaging and module assembly in the frame
- Tool-less disassembly of the modules
- Frame can be mounted in standard DIN housing
- High connector density (370 signal contacts available in size 4 frame)

Overview ODU MAC LC Modules

Modules	Positions	Units / Width	Current Informations acc. VDE	Page
	10 Positions	1 Unit (2.4 mm)	Reference voltage: 250V Rated surge voltage: 2500 V Degree of pollution: 2 Mating cycles: ≥ 5.000	5
	6 Positions	2 Units (4.8 mm)	Reference voltage: 400V Rated surge voltage: 2500 V Degree of pollution: 2 Mating cycles: ≥ 5.000	6
	5 Positions	3 Units (7.2 mm)	Reference voltage: 630V Rated surge voltage: 2500 V Degree of pollution: 2 Mating cycles: ≥ 5.000	7
	2 Positions 75 Ω COAX	5 Units (12 mm)	Frequency range: 2 GHz Mating cycles: ≥ 5.000	8
	4 Positions 50 Ω COAX	3 Units (7.2 mm)	Frequency range: 3,3 GHz Mating cycles: ≥ 5.000	9
	Spacer	1 Unit (2,4 mm) 3 Units (7.2 mm) 5 Units (12 mm)		10

Module 10 positions

1 Unit = 2.4 mm



Current Information acc. VDE 0298-Part 2

Reference voltage:	250V	50V
Rated surge voltage	2500V	2500V
Degree of pollution	2	3

Total mating force (Average):	8 N
Total demating force (Average)	6 N

Contact diameter:	0,7 mm
Material insulation body:	thermoplastic (Polyester) UL-94 V0 rated
Material contact:	Cu-Alloy, gold plated

Operating temperature:	-40°C up to +125°C
Mating cycles:	≥ 5.000

	Part-No.	Wire cross section mm ²	Termination AWG	max. Current (A)	Contact Resistance (mΩ) average
Insulation body	631 110 110 923 000				
Pin contact	185 423 000 270 000	0,15 - 0,38	22 / 26	7,0	3,5
Pin contact – short	185 431 000 270 000	0,15 - 0,38	22 / 26	7,0	3,5
Socket contact	175 581 000 270 000	0,15 - 0,38	22 / 26	7,0	3,5

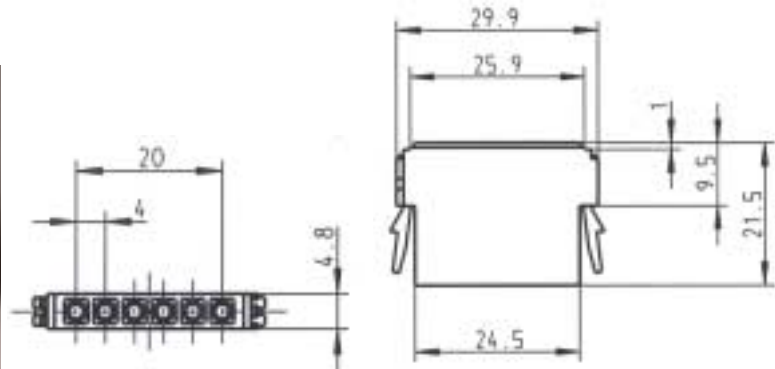
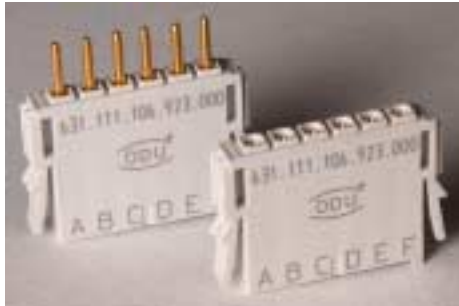
Tools¹⁾

Crimp Tool 1	080.000.051.000.000
Crimp Tool 2	080.000.037.000.000
Positionier for crimp tool 2	081.701.002.748.037
Removal tool	087.7CC.070.002.000

1) Crimp information see page 15

Module 6 positions

2 Units = 4.8 mm



Current Information acc. VDE 0298-Part 2

Reference Voltage	400V	160V
Rated surge voltage:	2500V	2500V
Degree of pollution	2	3

Total mating force (Average)	8,4 N
Total demating force (Average)	7,2 N

Contact diameter:	1,3 mm
Material insulation body:	thermoplastic (Polyester) UL-94 V0 rated
Material contact:	Cu-Alloy, gold-plated

Operating temperature:	-40°C up to +125°C
Mating cycles:	≥ 5.000

	Part-No.	Wire cross section mm ²	Termination AWG	max. Current (A)	Contact Resistance (mΩ) average
Insulation body	631 111 106 923 000				
Pin contact	185 424 000 270 000	0,5 - 1,0	18 / 20	15,0	1,8
Pin contact – short	185 432 000 270 000	0,5 - 1,0	18 / 20	15,0	1,8
Socket contact	175 535 000 270 000	0,5 - 1,0	18 / 20	15,0	1,8

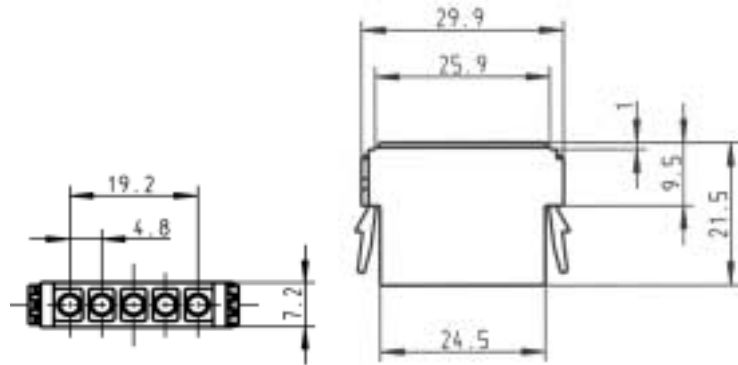
Tools¹⁾

Crimp Tool 1	080.000.051.000.000
Crimp Tool 2	080.000.038.000.000
Positionier for crimp tool 2	081.701.001.744.038
Removal tool	087.7CC.130.004.000

1) Crimp information see page 15

Module 5 positions

3 Units = 7.2 mm



Current Information acc. VDE 0298-Part 2

Reference voltage	630V	250V
Rated surge voltage	2500V	2500V
Degree of pollution	2	3

Total mating force (Average):	15 N
Total demating force (Average):	11,5 N

Contact diameter:	2 mm
Material Insulation body:	thermoplastic (Polyester) UL-94 V0 rated
Material contact:	Cu-Alloy, gold-plated

Operating temperature:	-40°C up to +125°C
Mating cycles:	≥ 5.000

	Part-No.	Wire cross section mm ²	Termination AWG	max. Current (A)	Contact Resistance (mΩ) average
Insulation body	631 112 105 923 000				
Pin contact	185.440.000.270.000	1,5 - 2,5	14 / 16	23,0	1,0
Pin contact – short	185.441.000.270.000	1,5 - 2,5	14 / 16	23,0	1,0
Socket contact	175.570.000.270.000	1,5 - 2,5	14 / 16	23,0	1,0

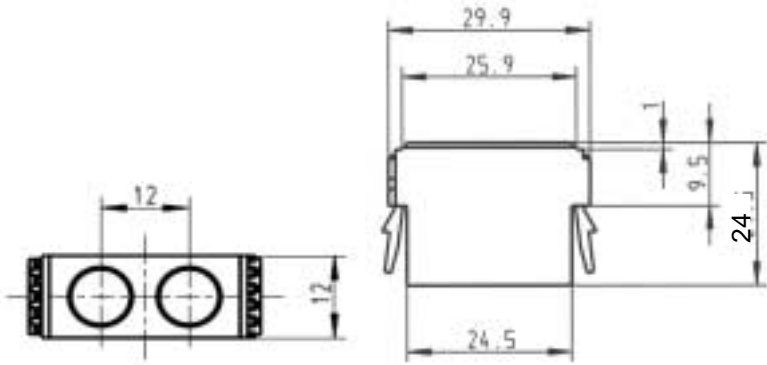
Tools¹⁾

Crimp Tool 1	080.000.051.000.000
Crimp Tool 2	080.000.038.000.000
Positionier for crimp tool 2	081.701.001.744.038
Removal tool	087.7CC.200.003.000

1) Crimp information see page 15

Module 2 positions for Coax-Contacts – 75 Ω

5 Units = 12 mm



Frequency range:

2 GHz

Current Information acc. MIL:

Reference voltage:

930 V

Test voltage:

2.790 V

Insulation resistance:

> 100 GΩ

Total mating force (Average)

9 N

Total demating force (Average)

8.2 N

Material:

Insulation body:

PBT / PTFE

Contact:

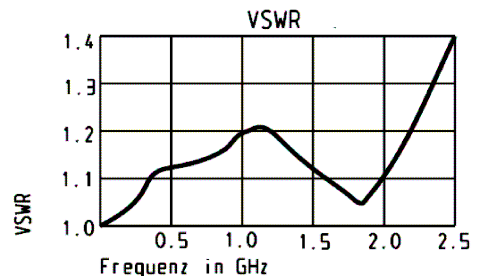
Cu-Alloy

Operating temperature:

-40°C up to +125°C

Mating cycles:

≥ 5.000



	Part-No.:	Cable Impedance Ω	Cable
Insulation body	631 120 102 923 000		
Pin Contact	122 131 003 270 000	75	RG179; RG187
Pin Contact	122.131.009.270.000	75	RG59
Socket Contact	122 131 004 270 000	75	RG179; RG 187
Socket Contact	122 131 010 270 000	75	RG59

Tools

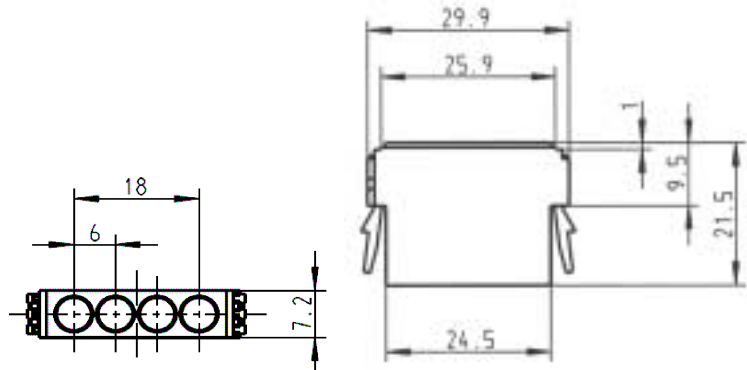
Crimp tool	080 000 039 000 000
Removal tool	087 7CC 690 001 000

On request: assembly instructions:
010.029.001.000.000 / 010.029.002.000.000

All dimensions in mm. All figures are illustrations of photos. Changes reserved

Module 4 positions for Coax-Contacts – 50 Ω

3 Units = 7.2 mm



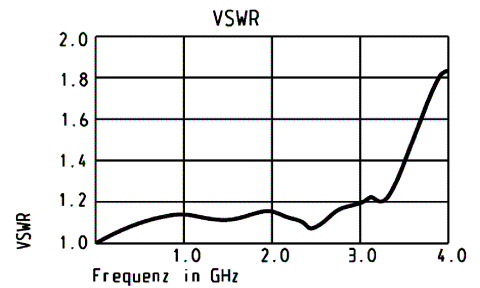
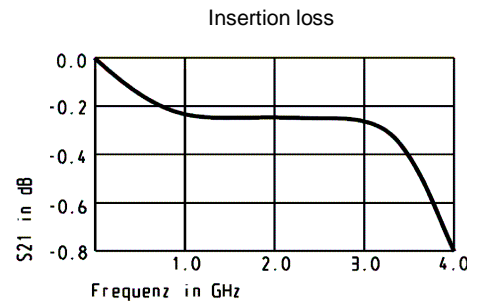
Frequency range: 3,3 GHz

Current Information acc. MIL:
 Reference voltage: 525 V
 Test voltage: 1.575 V
 Insulation resistance: > 100 GΩ

Total mating force (Average) 7.2 N
 Total demating force (Average) 6.8 N

Material:
 Insulation body: PBT / PTFE
 Contact: Cu-Alloy

Operating temperature: -40°C up to +125°C
 Mating cycles: ≥ 5.000



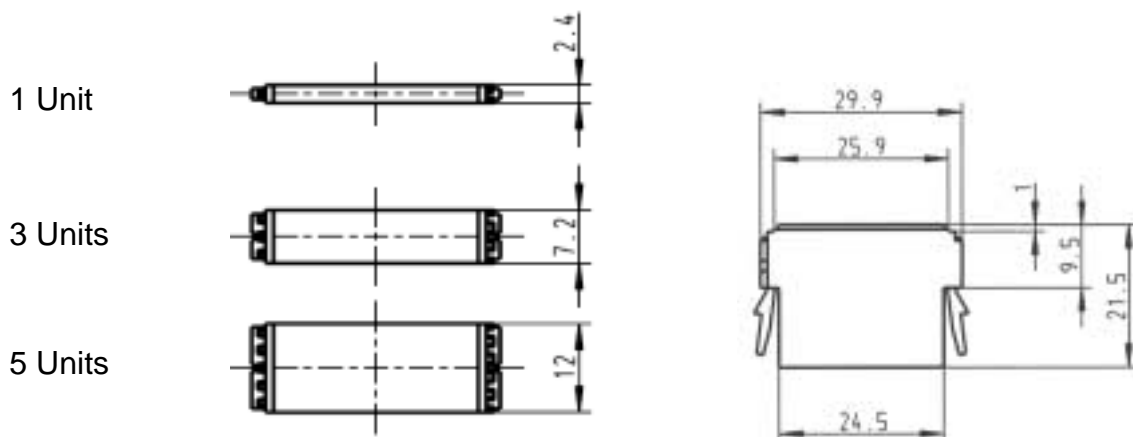
	Part-No.:	Cable Impedance Ω	Cable
Insulation body	631.121.104.923.000		
Pin contact	122.133.001.270.000	50	RG178; RG196
Pin contact	122.133.003.270.000	50	RG174; RG188; RG316
Socket contact	122.133.002.270.000	50	RG178; RG196
Socket contact	122.133.004.270.000	50	RG174; RG188; RG316

Tools

Crimp tool	080 000 039 000 000
Removal tool	087 7CC 310 001 000

On request: assembly instruction:
 010.031.001.000.000

Spacer

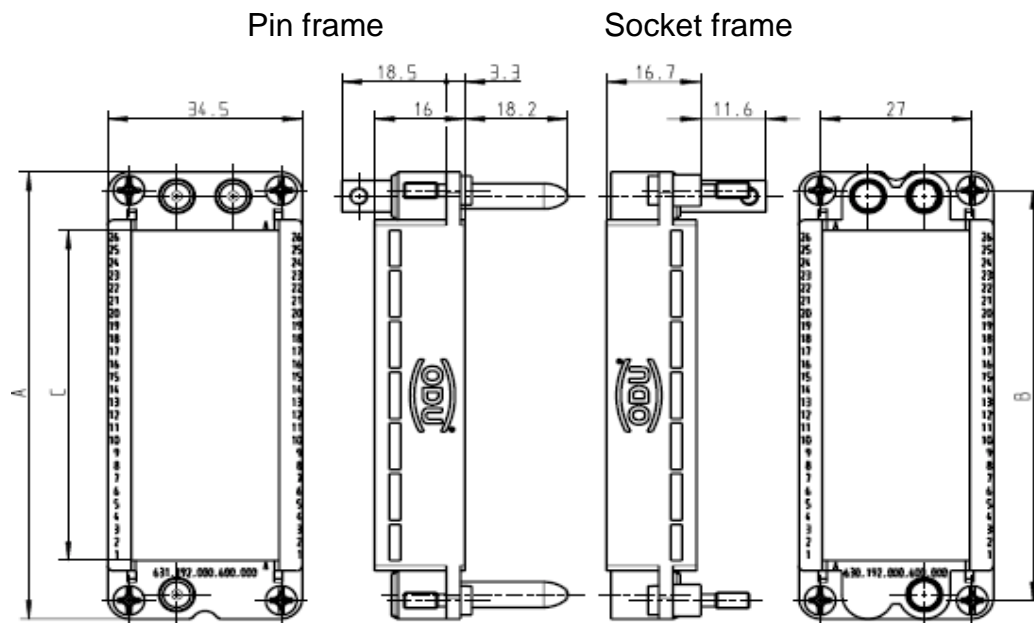


	Part-No.:
Spacer 1 Unit	631.151.000.923.000
Spacer 3 Units	631.153.000.923.000
Spacer 5 Units	631.155.000.923.000

Frames



- Zinc diecast frame – nickel plated
- 1 Unit = 2.4 mm



Size	Part-No.:	Description	Units	A	B	C
1	630 190 000 600 000	Socket frame	12	51	44	12 x 2.4 = 28.8
	631 190 000 600 000	Pin frame				
2	630 191 000 600 000	Socket frame	18	64	57	18 x 2.4 = 43.2
	631 191 000 600 000	Pin frame				
3	630 192 000 600 000	Socket frame	26	84.5	77.5	26 x 2.4 = 62.4
	631 192 000 600 000	Pin frame				
4	630 193 000 600 000	Socket frame	37	111	104	37 x 2.4 = 88.8
	631 193 000 600 000	Pin frame				

Tightening torque of the frame screws: 1.25 Nm

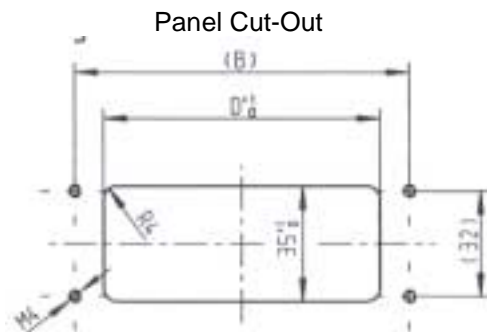
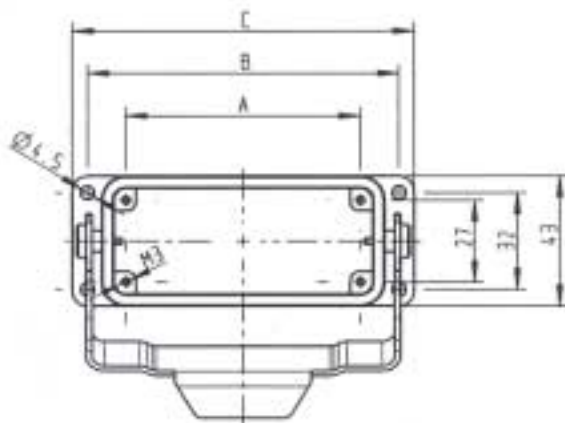
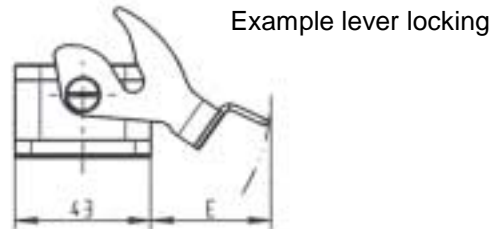
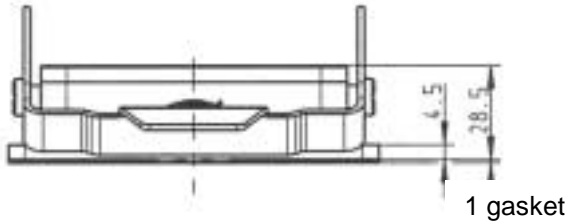
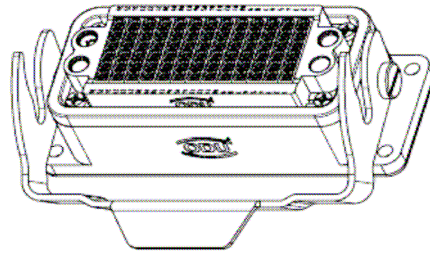
All dimensions in mm. All figures are illustrations of photos. Changes reserved

Panel-Mounted Base DIN housing including lever locking

Standard colour of housing: grey

IP 65 in mated condition

with and without protective cover available*



Size	Part-No.: Panel-Mounted Base	Dim. A	Dim. B	Dim. C	Dim. D x 35	Dim. E
1	490 130 400 644 000	44	70	80	48	ca. 25
2	491 130 400 644 000	57	83	93	65	ca. 35
3	492 130 400 644 000	77,5	103	113	82	ca. 35
4	493 130 400 644 000	104	130	140	110	ca. 35

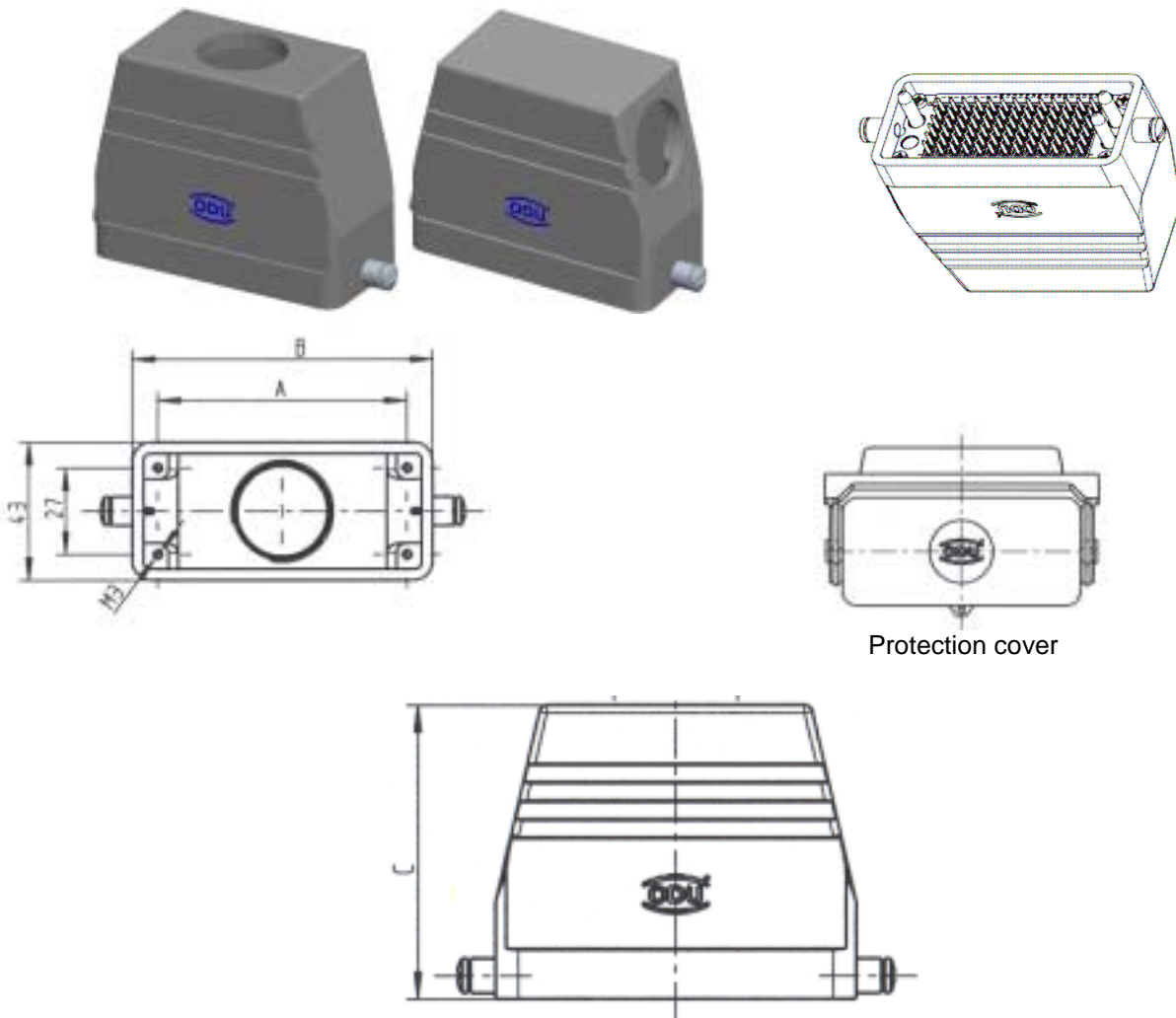
* with protective cover on request!

Box-Mounted Base on request!

Cable Hood DIN housing with straight or right angled exit

for lever locking

IP 65 in mated condition

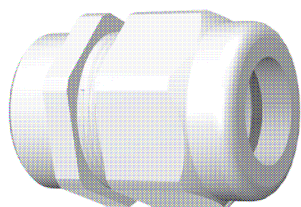


Size	Part-No. Cable Hood right angled exit	Part-No. Cable Hood straight exit	Dim. A	Dim. B	Dim. C	Exit x 1,5	Protection cover
1	490 414 450 644 102	490 214 450 644 102	44	60	48	25	490 097 212 644 000
	490 415 450 644 102	490 215 450 644 102			70	32	
2	491 414 450 644 102	491 214 450 644 102	57	73	50	25	491 097 212 644 000
	491 415 450 644 102	491 215 450 644 102			70	32	
3	492 415 450 644 102	492 215 450 644 102	77,5	93,5	76	32	492 097 214 644 000
4	493 415 450 644 102	493 215 450 644 102	104	120	78	32	493 097 214 644 000

All dimensions in mm. All figures are illustrations of photos. Changes reserved

Screwed cable gland for DIN housing

(acc. EN 50262)



Temperature:

-40°C up to + 100°C

Protection class:

IP 68 up to 5 bar

Width across flat:

M25 x 1,5: 30

M32 x 1,5: 36

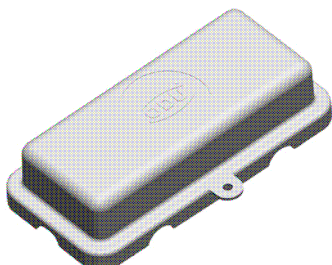
Starting torque:

M25 x 1,5: 8 Nm

M32 x 1,5: 10 Nm

Cable Ø	Part Number M25 x 1,5		Cable Ø	Part Number M32 x 1,5
6,0 – 13,0	027 825 060 130 007		7,0 – 15,0	027 832 070 150 007
9,0 – 17,0	027 825 090 170 007		11,0 – 21,0	027 832 110 210 007

Cover (Transport Cover)



Size	Part number with holding rope	Part number without holding rope
1	490 097 900 924 000	490 097 900 924 101
2	491 097 900 924 000	491 097 900 924 101
3	492 097 900 924 000	492 097 900 924 101
4	493 097 900 924 000	493 097 900 924 101

Crimp Information

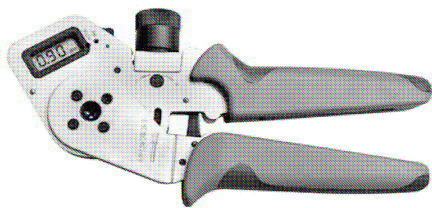
Termination cross section		Contact Ø	Strip-off length	8 pt. Crimp tool	8 pt. Crimp tool	8 pt. Crimp tool
				080.000.037.000.000	080.000.038.000.000	080.000.051.000.000
AWG	mm ²			Position no. Contact holder	Position no. Contact holder	Position no. Gauge Ø
22/26	0,15 – 0,38	0,7	4 ^{+0,5}	4 081.701.002.748.037		9 > 0,65 < 0,7
18/20	0,5-1,0	1,3	4,5 ^{+0,5}		5 081.701.002.744.038	10 > 1,1 < 1,15
14/16	1,5-2,5	2,0	5 ^{+0,5}		7 081.701.001.702.038	11 > 1,6 < 1,65

Crimp Tools and Contact Preparation

Crimping creates an easy, reliable, corrosion-free and long-term connection between conductor and contact. It requires little skill and can be performed by non-experts.

Crimping causes cold-flow of the conductor and contact material creating a gas-tight connection between contact and conductor. A stiffening of the conductor at the connection, as it is possible with soldering, can not occur.

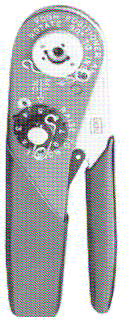
Crimping can be performed on very small to very large conductor cross sections.



8 pt. Crimp Tool

Adjustable for cross section from 0.08 – 2.5 mm² incl. Positioner for contacts Ø 0.7 - 2 mm – with user-friendly digital display.

Part-No.: 080.000.051.000.000

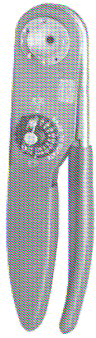


8 pt. Crimp Tool

Adjustable for cross section from 0.08 – 0.5 mm² (AWG 28 – AWG 20).

Part-No.: 080.000.037.000.000





8 pt. Crimp Tool

Adjustable for cross section from 0.38 – 2.5 mm²
(AWG 22 – AWG 12).

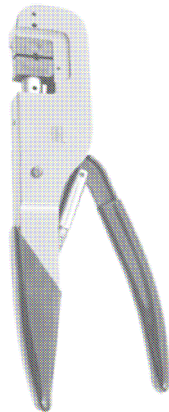
Table for adjustment and Contact holder = positioner – see page 15

Part-No.: 080.000.038.000.000

Crimp Instruction:

Correct crimp position will be attained by use of the appropriate Positioner. By rotating the selector knob to selected number you will get the correct crimp connection.

The crimp tool has an internal ratchet which opens only after completing the crimp process.



Hexagonal Crimp Tool

for Coax contacts , with locking system
(ratchet).

Part-No.: 080.000.039.000.000

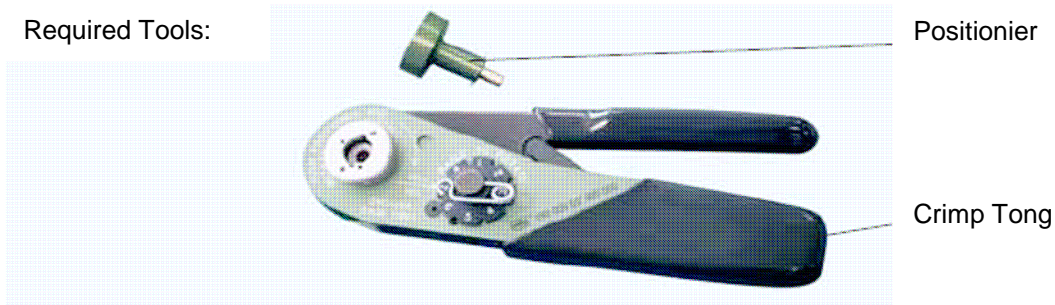


Coax-Cable	Crimp dies
RG 178, RG 196	082 000 039 101 000
RG 174, RG 188, RG 316, RG 179, RG187	082 000 039 102 000
RG 59	082 000 039 109 000

Please consider the assembly instructions mentioned on page 8 and 9.

Adjustment of the Crimp Tongs 080.000.037.000.000 and 080.000.038.000.000

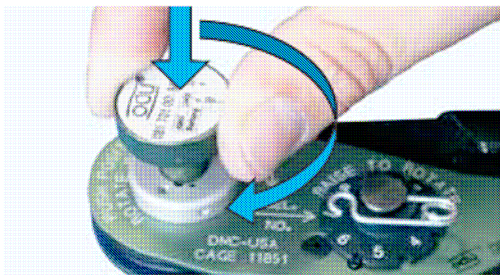
Required Tools:



1. Fasten the Positioner on the Crimp Tong



Please fasten the Positionier under consideration of the guiding into the tong.



080.000.037:
Therby push the positionier down and turn it clockwise at the same time.

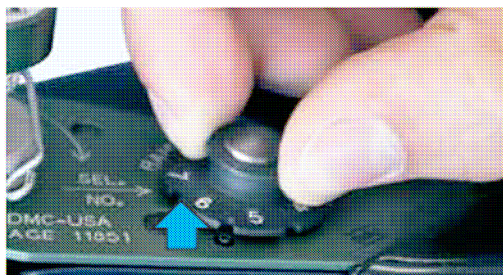
080.000.038:
You don't have to do this with this tong.



080.000.037:
To fix the positionier in this position, you have to use the attached safety pin.

080.000038:
Here you have to fix the positionier with some attached allen screw and the suitable spanner.

2. Adjust of the Crimp Tong for the cable cross section



Please turn the adjustment wheel onto the right position. If the adjustment is done, so please fix the wheel with the attached safety pin.

Now the tong is ready adjusted. You can start with the crimp process.

Removal tool



Contact Ø	Part-No.
0.7 mm	087.7CC.070.002.000
1.3 mm	087.7CC.130.004.000
2 mm	087.7CC.200.003.000

Removal of the contact from the front.
Cable of assembled contacts must **not** be cut off.

Removal of the contacts



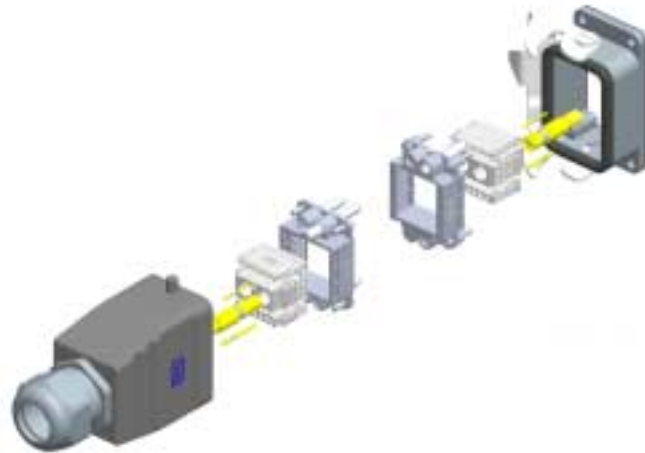
Press the removal tool from the front into the insulation body till a quiet „click“ is hearable.
By pulling on the cable the contact is removed from the insulation body.



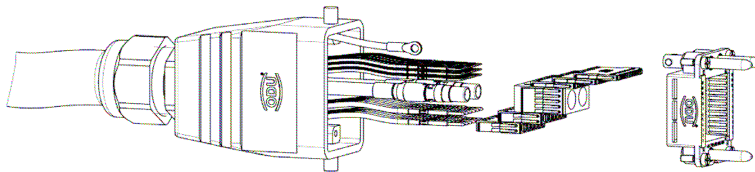
Removal tool for Coax-Contacts

Contact Ø	Part-No.
3,9	087 7CC 310 001 000
6,9	087 7CC 690 001 000

Assembly Instruction



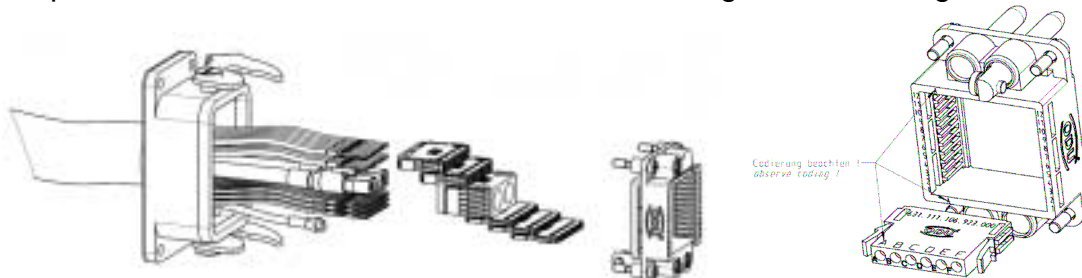
Step 1: Slide cable through housing / cable gland / Mounting aperture



Step 2: Strip cable and wire

Fit wire into the contact barrel and crimp (Crimp information see page 15)

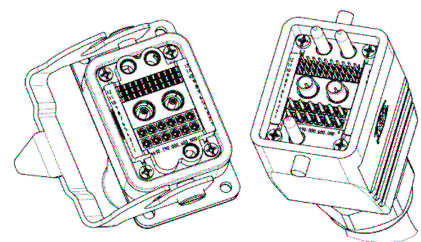
Step 3: Insert contacts into insulator according the numbering



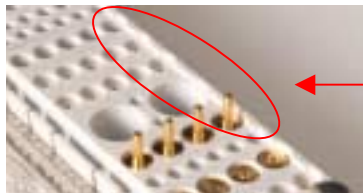
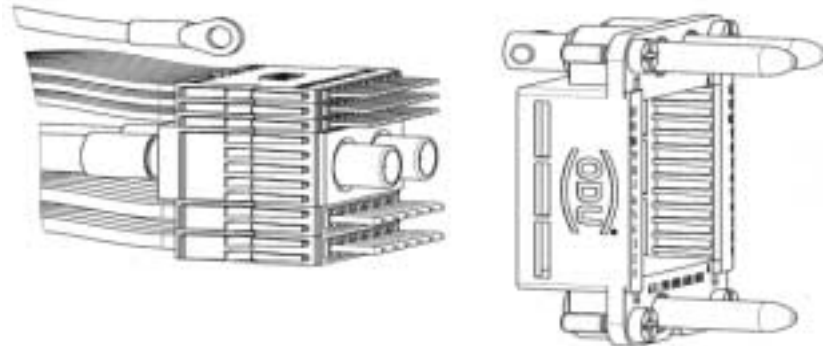
Step 4: Put assembled insulators into frame, observe (A to A) the coding
Clamp PE/Shield onto frame

Step 5: Mount complete assembled frame in housing,
observe locking torque of max. 1.25 Nm
Fix cable on strain relief

Step 6: Visual inspection / mating test
Frames always have to be filled up
with insulators or spacers

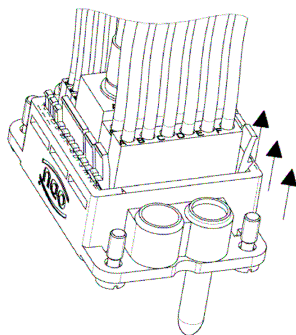


For easier insertion of the populated insulators in the frame locate them in correct position before inserting.



All coding bars should be in line.

See that all insulators were snapped in correctly. All snap fits should be in line.



For Disassembling of insulators always disassemble several insulators. Don't pull on the cable.
It is advisable for the disassembly of the insulators to begin at the edge of the frame.

All dimensions in mm. All figures are illustrations of photos. Changes reserved

Technical Information

Electrical Data:

- Current load (nominal and max. continuous):

Data is based on contacts terminated to correct size of conductors. No additional contact temperature rise due to incorrect conductors or cables. All measured contact temperature rise is due to contact resistance, only.

- Nominal current:

The current which causes a 45°C temperature rise (for example: for 23°C to 68°C)

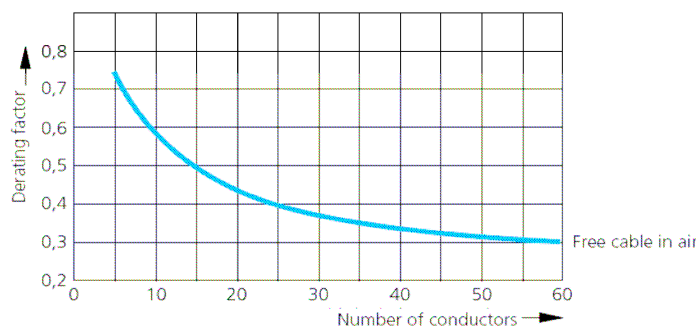
Derating factor

Current load values given in the connector and contact specifications in previous sections are single contact current loads.

With multi-position connectors and cables, the temperature rise is higher that with single contacts. It is therefore necessary to apply a derating factor to calculate the maximum current load per contact in multi-pole connectors. There is no precise specification for connectors. In praxis, on uses the derating factor form DIN 57 298 Part 2 and VDE 0298 Part 2 for multi-conductor cables (Ref. DIN 41 640, Part 3).

Derating Factor

Multi-Conductor cable with cross-section 1.5 to 10 mm². in air



Number of Conductors	in Air
5	0,75
7	0,65
10	0,55
14	0,50
19	0,45
24	0,40
40	0,35
61	0,30

Load Derating Factor plastic jacketed cable in air form 1.5 – 10 mm² in air

Example:

The cable has 24 conductors with a cross section of 6 mm² each. From the diagram the derating factor is determined as 0.4.

A single copper conductor with 6 m² cross section can carry a load of 44A. Therefore, a cable with 24 conductors of each having a 6 mm² cross section can carry maximum 17.6 A per conductor (44 A x 0.4 = 17.6A).